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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/867,993	05/24/2001	Patrick W. Fink	MSC-23228-1	7349

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HOUSTON, TX 77058

EXAMINER

ISSING, GREGORY C

ART UNIT	PAPER NUMBER
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3662

DATE MAILED: 01/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/867,993

Applicant(s)

FINK ET AL.

Examiner

Gregory C. Issing

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-13, and 25-40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. The terminology “each . . . having a non-unique phase center” is not understood; therefore, the scope of the claims is not ascertainable. If the applicant means that there are a plurality of phase centers associated with each (distributed) antenna, then “having a non-unique phase center” should read “having non-unique phase centers.”

4. The rejection with respect to each antenna having a plurality of phase centers is overcome. However, the list of articles cited by the applicants is not a part of the record and was not included in the response and, therefore, does not provide any support for the applicants' statements.

5. The rejection of claims 27-32 under 35 USC 112 par. 2 is overcome in light of the applicant's remarks “the variables involved and the GPS equations to which the equations in the claims refer are extremely well-known” and “familiar to those of skill in the art.”

6. The rejection of claim 33 is overcome by the amendment.

7. In claim 41, in line 5, “spaced apart antennas” should be “spaced apart transmitters” otherwise the claim is indefinite

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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9. Claims 1-44 are rejected under 35 U.S.C. 102(b) as being anticipated by Lightsey.

Lightsey discloses a system and method for determining navigation data (Figs. 5C – 5F) or attitude (Fig. 8A), i.e. location characteristics, of a vehicle, i.e. a body, using differential carrier phase measurements from a plurality of transmitters in the form of GPS satellites. The vehicle body utilizes a plurality of antennas mounted thereon and in a manner such that the antennas are not aligned, i.e. the antenna beams are pointed in different directions and therefore have different phase centers. Modeling the non-alignment of the boresights is required to produce accurate differential phase measurements; this is accomplished by translating the boresight vectors to the origin of a unit sphere, see Figure 14.

10. Claims 1-44 are rejected under 35 U.S.C. 102(a) as being anticipated by Fenton et al.

11. Fenton et al disclose the claimed method and apparatus including as shown in Figure 2, a plurality of antennas mounted on opposite sides of a body for generating a plurality of oppositely-directed antenna beams, i.e. antennas having different phase centers (non-unique), for determining the attitude of the body, i.e. location characteristic. Processing includes a phase discriminator that measures the difference in phase between the local carrier and received carrier, see col. 2, lines 1-30.

12. Claims 1-44 are rejected under 35 U.S.C. 102(a) as being anticipated by Ray et al.

13. Ray et al discloses a system and method for receiving GPS signals used for determining navigational data, which inherently includes location characteristics. Moreover, the system utilizes a plurality of antennas, each having a different phase center, see Figure 2 – 41p, 43p, 45p, 47p and 49p. The GPS signal inherently includes an RF carrier signal which is transmitted to the antenna system. Differential carrier phase measurements are made, see Figure 4A/B.

14. The applicants argue all of the references together alleging (1) that the cited prior art fails to disclose antennas having non-unique phase centers, (2) that the cited prior art fails to determine location or attitude based on the signals received from antennas with non-unique phase centers, and (3) the cited prior art requires two or more antennas. None of the arguments are convincing. Each of the cited references disclose antennas having non-unique phase centers in the form of non-aligned antennas (Lightsey), oppositely-directed antennas (Fenton et al), and multiple phase centers (Ray et al). Moreover, Applicant alleges that instead, the phase centers of the antennas in the prior art is assumed to be known; it is not understood how this has any bearing on the topic of whether non-unique phase centers are existent. In view of the applicant's remarks "it is well-known to those of skill in this art that the mounting of one antenna can have a plurality of phase centers" as well as the remarks supporting the applicant's comments to overcome the 35 USC 112 rejection regarding non-unique phase centers, and the applicants' specification on page 2 ("(w)hile wrap-around antennas, such as spherical and cylindrical antennas, are known, to have a wide angle coverage . . . they also have a non-unique phase center. For instance, if a plurality of satellite signals are received by a wrap-around antenna, there may be a plurality of different phase centers, equal to the number of observed satellites"), the applicant's argument that making use of an antenna having non-unique phase centers is not patentably distinguishable over the prior art. Each of the cited references uses signals received by the antennas to determine conventional GPS data including attitude of the vehicle body or pseudoranges, each of which corresponds to location characteristics. Lastly, the claims are not limited to use of one antenna as alleged by the applicants; the alternative language "one or more" is met by the prior art. Furthermore, the "one distributed antenna" such as a wrap-around

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antenna may actually include multiple antennas, see page 21, lines 10-20, otherwise, a single antenna will always have a unique phase center that is not common to non-existent antennas.

Thus, the applicants' comments are not persuasive.

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lightstone discloses compensation for distortions in multiple phase center phased arrays. Tittensor et al disclose calibration for an antenna array wherein the phase centers for the respective antenna elements are displaced longitudinally and laterally. Tranquilla et al disclose methods used for determining the phase center of an antenna in order to accurately determine range in radio positioning systems. Taggart et al disclose the calculation of phase center for spacecraft phased array antennas wherein it is shown that in general, complex antenna arrays do not have unique phase centers.

16. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

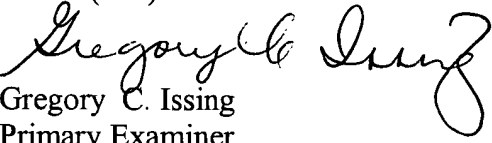
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17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory C. Issing whose telephone number is (703)-306-4156.

The examiner can normally be reached on Mon-Thurs 6:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Tarcza can be reached on (703)-306-4171. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1113.


Gregory C. Issing
Primary Examiner
Art Unit 3662

gci

1/20/04